

## INTERVIEW ARVIND GUPTA FOR CHAMPAK 16 SEP 2016

1. How can we make children understand that there is Science around us - in almost everything we see?

Well Science is all around us – the way we breathe, walk and talk, the trees we see, the sky the sun – there is so much of science. The restricted confines - the four walls of the classroom are actually a bad place for learning science – for much of the science is outdoors. A good school must endeavor to take children outside – on fieldtrips to experience the beauty of nature. To touch, smell, feel and experience are first steps in science. Children learning goes from the NEAR to the FAR, from the CONCRETE to the ABSTRACT.

2. What sparked your interest in Science?

As a child I was a tinkerer. Being poor we had very few toys. So we made our own toys from old matchboxes, cigarette packs and shoe polish tins. These were some of the throwaways in my times. Once a rich relative gifted me a Mecanno. I played for many long hours with it, making many more models than were listed in the brochure. I also had a very nice Math teacher Mrs. Frey and she made us do a lot of activities in Math.

3. How can children learn from playing with toys? It is usually seen as a way to pass time and something that kids do while taking breaks from learning and not as a learning activity in itself.

Play is a very serious business. The best things – skills, cooperation, respect for others, teamwork are all learnt during play. In India play is often frowned upon. Here I am not referring to play in the physical sense of games and sports, but play as something with intrigues, absorbs you completely and gives you a lot of pleasure. They could be a puzzle, Tangram, a small model of the windmill etc. We emphasize a lot on mugging and scoring high in exams and tests. Children hardly experience – all math and science is learnt through rote. Terrible! Children need to make things; pull things apart assemble them back again. Children learn a lot without being taught. Children who do not play, who have an unhappy childhood grow up to make bombs and guns. Happy people do not wish to harm or kill anyone.

4. What are schools doing wrong when it comes to teaching science?

The schools have got it mostly wrong – they try to COVER the course – forgetting that the prime task of education is to UNCOVER. In most good schools children do no science experiments until class 8. In 9<sup>th</sup> they might be taken to the lab where the teacher may demonstrate to them how Oxygen is made. But children still don't dirty their hands. Most teachers come from a very mutilated system – with all the right degrees but very few skills. They have never themselves experienced the thrill of doing science – and so they can only make their children mug dreary, boring science definitions. I have visited thousands of so called good, rich schools. Their labs are full of burettes, pipettes and gleaming test tubes. But close observation will reveal a grime of dust. For all this fancy equipment was meant for the INSPECTORS and not the CHILDREN.

5. You've said that when you worked with an automobile company, you volunteered to teach at a village and that's when you stumbled upon the idea of teaching science using toys made from simple materials. Was there any particular incident/ interaction that motivated you to do that?

In 1978 I took a year's unpaid leave from TATA MOTORS to work with the Hoshangabad Science Teaching Program. This program aimed to revitalize science learning through activities in village schools. In the first month I designed a Mecanno using bits of cycle valve tube and matchsticks. Children could make simple 2-D and 3-D models, learn wonderful science and have loads of fun from this simple, low-cost teaching aids. That enthralled me. I said, this is much better than making trucks. The HSTP experience opened up a larger window in my life – it showed me what I should be doing. We are all born to become butterflies – to flit and fly, we must not settle in life to merely crawl and remain caterpillars.

6. You've also spoken about being inspired on seeing a group of kids making a dump truck out of match sticks. How did witnessing children without formal education make "complex" toys impact you?

This was in the iron ore mines of the Bhilai steel plant. Every day thousands of tons of ore would be loaded into wagons by dumpers and tipper trucks. The children in this small poor township make small models of Dump Trucks using two matchboxes. That showed me the innate creativity of children. All children are born scientists. They want to make sense of the complex world they live in. They all do a lot of tinkering, pottering while still small. As soon as they join school they stop doing science and start cramming. Schools make idiots out of so many clever children.

7. How do you come up with these toys? How do you design them? What is the process of designing them? Do you work with anyone else in this?

I worked in a Children's Science Center located in the Pune University for 11 years. We had a small team of 4 people – all tinkerers, documenters. Every single day we celebrated – played the whole day and earned a small survival wage. Today we have over 7500 videos in twenty languages with a viewership which has crossed 50-million! Every day we designed, built low-cost models, tested them on children and documented them. Many ideas came from passionate individuals, books, and the internet and from the children themselves.

8. How is science a part of life in villages, and in our traditional toys that we fail to recognize?

Well India has always had a vibrant culture where children made their own toys. The book JOY OF MAKING INDIAN TOYS by Prof. Sudarshan Khanna symbolizes it the best. This book is a collation of 100 simple toys which children made. Twenty years back I translated this book for the National Book Trust. Traditional toys use simple, often discarded, throwaway materials for making toys. These toys spins, making sound, fly and do the most fantastic things. While playing with them children intuitively learn many principles of science. The nicest thing about traditional toys was that they

provided livelihoods, and were low-cost so even poor children could afford them. Any vibrant educational curriculum will bring back these toys – not only to teach children about science, but to put the “gleam” back in their eyes.

9. Can you give some examples of traditional toys that use science? For example, you’d spoken about the Andhra puppets – flying man – that can be used to explain centrifugal force.

Sudarshan’s book gives scores of examples. Children make whistles by rolling leaves. Using two broomsticks they make a Sudarshan Chakra which gives them a great feel for Centrifugal Force. Traditional toys are not like the black set up box with some glittering LEDs. These toys are transparent where you can actually touch and feel the materials and learn a great deal

10. What is the best part about what you do – creating new toys or seeing the reaction of kids when you display your toys or the fact that they are actually learning science?

Our motto was simple **WE WISH TO REACH OUT TO THE POOREST CHILDREN ON EARTH.** I have scanned and uploaded over 6000 passionate books on Education, Science, Math, Environment, Anti-War, Peace and great children’s books from across the world. Everyday 20,000 books get downloaded for FREE. It just shows the hunger for good books in our children and the power. This is the true power of the INTERNET – to make the best available to the poorest for free.

11. In all these years that you’ve worked with kids and traditional toys and waste materials, what was the most fascinating thing/ fact/ learning that you stumbled upon?

I am always amazed at the abilities of children. They surprise me no end. Often we make models and try them with children. Invariably the children suggest changes and take the model to a much higher level. One lesson and takeaway – **ADULTS HAVE A LOT TO LEARN FROM LITTLE CHILDREN.**

Arvind Gupta

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